

Muhammad Raees Azam

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OBJECTIVES

To pursue advanced studies in AI, machine learning, and robotics at a prestigious institution abroad, leveraging my expertise and achievements in computer engineering to contribute to innovative research and community betterment.

RESEARCH INTEREST

Interest Related to Machine Learning, AI and Computer Vision

- Generative Adversarial Network (GAN)
- Interpretable Neural Network
- Image Segmentation
- Action Recognition
- Hybrid System
- Medical Images and Early Predictions
- Image Generation and Synthesis

Interest related to Cyber Security and Data Analysis

- Deep Learning for Malware Detection
- Cyber-Physical System Security
- Privacy-Preserving Data Analysis
- Internet of Things (IoT)
- Big Data Analytics for Cyber Threat Intelligence
- Vulnerability Assessment

Interest Related to Robotics, Control System and AI-Driven Movement

- Robotic Path Planning and Navigation
- Autonomous Vehicle Control
- Multi-Robot Coordination
- Robot Manipulation and Grasping
- AI-Based Motion Planning
- Human-Robot Interaction
- Swarm Robotics
- Bio-Inspired Robotics
- Robotic Exoskeletons and Prosthetics
- AI-Powered Motion Synthesis

EDUCATION

2020-2024

BS Computer Engineering, COMSATS University Islamabad, Abbottabad Campus, KPK, Pakistan

- CGPA:3.28
- **Core Courses** : Electronics, Digital System Design, Embedded Systems, Artificial Intelligence, Control Systems, Machine Learning, Neural Networks, Digital Image Processing, Website Development

2017-2019

FSC Computer Science, Edwardes College Peshawar, KPK, Pakistan

- **Marks:**886/1100 | **Percentage:** 80.5% | **Core Courses** : Computer Science, Physics and Mathematics
- Awarded with **Double Gold Medal** In Computer Science Department and **Student Talent Award 2018**

SKILLS

KEY SKILLS

- Python, TensorFlow, Keras
- Java, MATLAB, C/C++, C#
- HTML, CSS, JavaScript
- Verilog HDL, Assembly Language
- PCB Designing, Proteus, Circuit Maker
- Machine Learning, Deep Learning, Neural Networks
- Digital Image Processing, Embedded Systems
- Control Systems, Artificial Intelligence

TOOLS/APIs

- Tensor Flow, Keras
- Proteus, Circuit Maker, MATLAB, Mission Planner
- Visual Studio, Android Studio, Google Cloud Platform
- VS Code, Jupiter Notebook, Google COLAB
- Git, Replit, GitHub

HARDWARE

- Arduino Nano, UNO
- MSP430
- Raspberrypi
- PIC Microcontroller
- NAO Robot, Mbot Ranger and LEGO EV3
- APM Flight Controller

PROGRAMMING LANGUAGES

- Python, MATLAB
- C/C++, C#
- Java, HTML, CSS, JavaScript
- Verilog HDL, Assembly Language

DATABASES

- Microsoft SQL Server
- MySQL
- Microsoft Access, Firebase

Final Year Project

A Robust Artificial Intelligence Based Crop Monitoring System for Pakistani Agricultural Land

Addressed the limitations of traditional crop monitoring methods by creating a system that analyzes rice crop health using RGB aerial images. The project focused on detecting plant diseases, their causes, and potential solutions through advanced image processing techniques and deep learning algorithms.

Key features include

- **Aerial Imagery:** Used RGB images captured from aerial drones for crop analysis and Targeted Spraying.
- **Image Processing & AI:** Applied image processing techniques along with FCN-8s for segmentation and CNN for disease classification.
- **Mobile Application:** Developed a real-time classification mobile application using Flutter to provide immediate insights on crop health issues.
- **Tools/ Techniques:** Google COLAB, Mission Planner, Debian, Raspberrypi, Arduipilot, Python, CNN, FCN 8s, Segmentation and Classification, Kaggle, Flutter, L298N, GPS, Keras, Tensorflow.
- **Project Achievements:** Top 100 Finalist Globally in Google Solution Challenge 2024, Fully Funded by Pakistan Engineering Council, 2nd Prize winner of KP Capstone Expo 2024 by PEC, Finalist in Google Cloud Startup Competition Pakistan.

Projects

1. Global Radiation Prediction using Neural Network Time Series

- Developed a predictive model using neural network time series analysis for global radiation prediction.
- Implemented machine learning techniques to improve the accuracy of radiation forecasts.
- MATLAB NN-Tool is used to make this model with 96% testing and 98% Training accuracies.
- **Tools/ Techniques:** C++, MATLAB, NN-Tool, NARX Algorithm

2. Malicious Application Classification Using Machine Learning

- Created a system to classify applications as malicious or benign using various machine learning algorithms.
- Focused on improving cybersecurity measures by identifying harmful applications.
- Implementation on various Techniques using Deep Learning and Traditional Machine learning Methods and Comparison matrices also using SVM, Random Forest, ANN and DNN Techniques.
- **Tools/ Techniques:** Python, Google COLAB's Notebook, Tensor flow, keras , sklearn, SVM, Random Forest, ANN, DNN, K-Mean Algorithm Implemented

3. Diseased Plants and Lungs Semantic Segmentation Using FCN

- Implemented FCN 8s for semantic segmentation of diseased plant leaves and lung images.
- Binary Class segmentation using 3 Channel for Disease Plants and 1 Channel for Lungs Segmentation.
- Recognized as the best semester project for its innovative use of deep learning techniques in medical and agricultural domains.
- **Tools/ Techniques:** Python, Google COLAB's Notebook, FCN 8s, Tensor flow, keras , sklearn, Data preprocessing

4. Segmentation in Agricultural Images using Traditional Machine Learning

- Developed segmentation algorithms for identifying different regions in agricultural images.
- Applied traditional machine learning methods to enhance the precision of segmentation.
- Using Extracting multiple features using Gabor Filters and making Filter Bank of it.
- Using SVM and KNN for Segmentation and Pixel wise classification of Filter Bank.
- **Tools/Techniques:** Jupiter notebook, Python, KNN, SVM, Filter Bank, segmentation, Classification

5. Targeted Spraying Drone Project using Raspberry Pi

- Developed an AI-driven drone system for targeted spraying in agriculture.
- Used machine learning algorithms to identify and target specific areas for spraying, improving efficiency and reducing chemical usage.
- Technology used in this is Tensorflow Lite, Debian Bookworm Operating System, L298N Motor driver with Sucking DC Motor
- **Tools/Techniques:** Mission Planner, Debian OS, Python, LINUX, Tensorflow, raspberrypi, Arduipilot

6. The RLC Modified Trainer

- Designed and developed an advanced Compactfull and Cost efficient Design as compared to traditional RLC Trainer RLC trainer for educational purposes.
- Achieved 2nd position at TechFestFall21 Project competition.
- PCB Designing and Fabrication is implemented.
- **Tools/Techniques:** Proteus, PCB Designing and Fabrication, Triac and Diac.

7. Robotic Arm using Arduino

- Developed a robotic arm controlled via Arduino microcontroller.
- Implemented precise movement algorithms for various tasks.
- Servomotors with Cardboard design Arms are made
- **Tools/Techniques:** Arduino UNO, C++, Proteus, Servo Motors, Potentiometers.

8. Home Automation using IoT(Internet of Things)

- Developed a home automation system using Internet of Things (IoT) technologies.
- Implemented control and monitoring of home appliances via a mobile app.
- **Tools/Techniques:** Nodemcu 8266, Arduino IDE, C++, Blynk

SYNOPSIS OF ACHIEVEMENTS

Academic Achievements

- 2nd Prize Winner at **KP Capstone Expo 2024** by Pakistan Engineering Council.
- My Final Year Project (FYP) has been fully funded by **Pakistan Engineering Council** for complete project duration from years 2023-2024 worth of 0.2 Million PKR.
- Selected as a Data Engineer Position at **National Center of Artificial Intelligence** of CISNR Lab UET Peshawar in 2024
- Selected as a Robotics Internee at **National Center of Robotics and Automation** ARAL Lab, UET Peshawar in 2022
- I secured the 2nd position in the **TechFestFall21 Project Exhibition Competition**, which took place at the COMSATS University Islamabad, Abbottabad Campus and featured a total of 45 contestants.
- Selected as a Teacher's Assistant in **PIF's National STEM School** in NUST CEME 2019.
- Shield of Appreciation at **Student Talent Expo** Continuously from 2016, 2017, 2018 and 2018.
- I was the Best Graduate and got **Gold Medal** from Edwardes College Peshawar during my Intermediate studies along with full scholarship.
- Selected in Pakistan Innovation Foundation's National STEM School Maker's Summer Camp 2018 in Cadet College Hasanabdal
- Appreciation Certificate at **Pre-STEM Exhibition by Edwardes STEM Society** in Edwardes College Peshawar 2018 by Presenting IoT Project of Home Automation.

Co-Curricular Achievements

- Invited as **Guest Speaker** at GDSC Global Graduation Ceremony 2024 by Google for Developers.
- Declared as Top 100 Finalist Globally of **Google Global Solution Challenge 2024**.
- Shield of Resource Person at Government College of Technology Abbottabad for "**Arduino 101 Workshop**" in 2023.
- Trainer on multiple Workshops with IET On Campus, IEEE and GDSCs Chapters
- Shield of Outstanding Performance at **Google Developer Students Club as Campus LEAD** in 2023
- Selected as a Google Developer Student Club Lead by **Google for Developers** for 2023 – 2024.
- 3rd Prize Winner at **Multimics Creative Competition** in Logo Designing Competition 2020.
- 1st Prize Winner at **Multimics Creative Competition** in Poster Designing Competition 2020.
- Appreciation Certificate at **Student Talent Expo 2019** in the category of Science & IT Exhibition.
- Winner of **NASA Space App Challenge 2019** at CECOS University by Team RaheQamar.
- Top 25 Finalist in **Pakistan Startup Cup 2018** from Peshawar, KPK for presenting MeatInspector
- 3rd Prize winner in **Startup Weekend Peshawar 2017** at Basecamp, Peshawar2.0 for presenting MeatInspector